

Building a Pandemic- and Climate-Resilient World

A Blueprint for Action by World Leaders
at COP-28 and Beyond

November 2023



Introduction

The warming climate directly impacts human health in a number of ways pertinent to pandemic threats, including immediate threats to respiratory health from air pollution and increased vulnerability to infectious diseases with epidemic and pandemic potential as a consequence of rising temperatures and changing ecosystems. Recognising the interconnectedness of human, animal, and environmental health is pivotal in adopting a holistic approach, embracing the concept of One Health.

Climate change is also undermining health infrastructure and supply chains. Slow rise issues, such as warming temperatures, as well as sudden impact events, such as climate-driven storms and natural disasters, challenge the integrity and effectiveness of medical supplies and threaten health systems, disrupting access to essential health care, and amplifying the vulnerability of communities.

A more integrated and systemic approach is needed to address the impacts on people and on health infrastructure and should span more than just the crisis response phase of climate events and pandemic threats. **This paper sets out the main challenges that climate change poses to human health and health infrastructure and calls on leaders to prioritise action in three areas to build and sustain health systems that are both pandemic- and climate-resilient.** We call specifically for the establishment of an expert Commission to reach consensus on the most effective interventions and their costs, and priorities for additional investments through global financial institutions.

1. Health and potential pandemic impact of fossil fuels

Ending fossil fuel dependence is a prerequisite for a healthier world. The repercussions of climate change pose significant threats to both human health and the well-being of our planet, and on top of this, disease outbreaks will become more frequent — increasing the risk of emerging pandemic threats. The World Health Organization (WHO) predicts that between 2030 and 2050, [climate change is expected to cause approximately 250,000 additional deaths per year](#). A vital part of addressing the root causes of these deaths means reducing carbon emissions through an accelerated, fair, and just transition.

Impact on Respiratory Health

The repercussions of burning fossil fuels are dire for human health, particularly respiratory well-being. Fine particulate air pollution (PM2.5)¹ from burning fossil fuels infiltrates the respiratory system upon inhalation. In 2019, WHO estimated that indoor and outdoor air pollution causes [7 million deaths per year](#) and that the costs of the health impacts of air pollution reached [over US\\$8.1 trillion, or 6.1% of global GDP](#). In 2020, the air in people's homes exceeded WHO guidelines for safe concentrations of PM2.5 by [30-fold on average in 62 countries](#). This not only [exacerbates existing respiratory conditions such as asthma and chronic obstructive pulmonary disease \(COPD\)](#) but also acts as a precursor, creating a fertile ground for airborne and lung-related diseases.

Prolonged exposure to air pollution [significantly raises the risk of respiratory infections, cardiovascular diseases, and other health complications](#). Additionally, populations residing in areas with high pollution levels often experience weakened immune systems due to chronic exposure to air pollutants from burning fossil fuels. This compromised immune function amplifies susceptibility to infectious diseases, accentuating the impact of epidemics and pandemics.

Impact on Disease Outbreaks

Another dimension of the impact of climate change on health unfolds as global temperatures rise, [making future pandemics more likely](#). Elevated temperatures create a conducive environment for the proliferation and transmission of infectious diseases. Shifts in the thermal performance curves (TPCs) of pathogens, vectors, and hosts, as well as changing patterns in rainfall, land use, agriculture and livestock practices, and migration are causing the emergence and adaptation of dangerous pathogens through new transmission pathways.

Diseases such as malaria, dengue, and Zika virus — traditionally constrained by specific climatic conditions — are now expanding their range. For example, the number of months suitable for malaria transmission increased [by 31.3% in the highland areas of the Americas and 13.8% in the highland](#)

¹ Fine particulate air pollution, often denoted as PM2.5, refers to airborne particles that have a diameter of 2.5 micrometers or smaller. These particles are exceedingly small, making them inhalable and capable of penetrating deep into the respiratory system.

[areas of Africa from 1951–1960 to 2012–2021](#), and the likelihood of dengue transmission rose by 12% in the same period.

The warming climate, the interconnectedness of ecosystems, and the encroachment of human activities into wildlife habitats contribute to the [increased likelihood of spillover of zoonotic diseases from animals to humans](#). Desertification and deforestation, driven by climate change and disrupting ecosystems is bringing humans into closer contact with wildlife and increasing the risk of infectious diseases jumping the species barrier. These diseases can be [transmitted by direct human contact](#) with infected wild or domestic animals and by [indirect contact](#) in areas where animals live and roam. Zoonotic diseases are believed to comprise more than [60% of new infectious diseases and 75% of emerging pandemic threats to humans](#). An estimated 1.6 million yet-to-be discovered viruses across 25 virus families with pandemic potential are believed to be residing in mammal or bird hosts. There is even the prospect that [pathogens frozen in the permafrost may be released as the climate continues to warm](#).

To start addressing these highly integrated impacts of climate change and pandemics on both people and health infrastructure, world leaders must:

- **Commit to an [accelerated, just, equitable, and full phase-out of fossil fuels](#) as the decisive path to health for all.**
- **Enact policies to accelerate climate-friendly transport, food, and energy use**, which offer the potential both to reduce greenhouse gas emissions and produce major health co-benefits, including reducing air pollution.
- **Decarbonise health systems and supply chains** by facilitating their transition to solar, wind, and other renewable energy sources. This will reduce greenhouse gas emissions and help shore up health infrastructure and ensure more dependable power and clean water supplies so health facilities can continue to operate in emergencies. Although initial transition costs may be high, major cost savings will accrue over time in terms of protected infrastructure, reduced energy bills, and reduced spread of infections.
- **Develop early detection systems** that prioritise areas where different pathogens, vectors, reservoirs, and human hosts are brought together and whose characteristics have been changed by warming temperatures with potential impacts on spillover risks.
- **Invest in sustained research, development, and delivery of medical countermeasures** against the disease families most likely to cause future pandemics, including by fully funding [CEPI](#) and the [100 Days Mission](#).

2. Climate change impact on pandemic supply chains and health systems

Climate change is impacting health security at two speeds:

- **Slow-rise issues including rising temperatures and disrupted ecosystems.** Rising sea levels are threatening [medical facilities in the Pacific Island countries](#), the majority of which are located within 500 meters of the coast. Warming temperatures can also have a direct impact on the thermostability of vaccines and drugs, making them less effective and increasing the challenges of maintaining a cold chain, which can already account for [up to 80% of the cost of vaccination programs](#). Currently, most vaccines must be stored between 2-8 °C. Both heat as well as accidental freezing can cause vaccines to lose their potency.
- **Sudden-impact events that can impact the functioning of healthcare facilities directly.** These events, including power outages and water shortages, can damage healthcare facility infrastructure and can prompt increased demand, which further undermines response to outbreaks. Puerto Rico, for example, was [forced to stop Zika surveillance](#) and response in the aftermath of Hurricane Maria. As a result of a series of devastating cyclones, Malawi was faced with a [mounting cholera outbreak all while hundreds of health facilities were destroyed](#).

Climate change also increases the risk of supply-chain disruptions due to the greater risk of extreme climate/weather events that infrastructures cannot withstand. A significant number of health facilities are [still being built in areas highly prone to disasters](#). A 2015 heat wave in India caused the closure of several pharmaceutical factories, leading to shortages of essential medicines. Following the 2018 floods in Kerala, India, hospitals faced [power outages anywhere from three to nine days causing shutdown of cold storage systems](#). Entire stocks of vaccines and other essential medical supplies were damaged, with an estimated total loss of over US\$15 million. Similarly, the majority of the production of active pharmaceutical ingredients (API) is [concentrated in a few regions in China and India](#). A climate-induced disaster in just one of these regions could have dramatic repercussions globally.

Making supply chains and health infrastructure both pandemic- and climate-resilient will require building context-specific resilience into every stage, from the sourcing of ingredients and construction of facilities to the manufacturing, stockpiling, and delivery of countermeasures and supplies. Some of the measures required include:

- **Developing joint vulnerability atlases for pandemics and climate change**, showing the different factors that make a particular area or population more vulnerable to a disease outbreak, a natural disaster, or an environmental problem.
- **Ensuring medicine ingredients are sourced from sustainable, resilient, and geographically diverse sources**, so major climate, health, or political catastrophes do not derail production.

- **Reinforcing all health infrastructure while ensuring construction is able to withstand extreme weather** and is built in areas that are less likely to be affected by climate-induced events.
- **Stockpiling medicines to minimise their exposure to climate change** and other risks, ensuring regularity throughout to avoid expiration.
- **Allocating more resources to cold chain elimination** by developing and scaling up vaccine technologies that are heat stable.
- **Involving a wide range of stakeholders in the development of [national health and climate change adaptation plans](#)** to develop contingency plans, back up systems for essential services (electricity, heating, cooling, ventilation, and water supply), adapt health worker curricula, enhance surveillance and early warning systems for health and climate hazards, reduce greenhouse gas emissions, etc.
- **Integrating climate data into health surveillance and early warning systems** to combine clinical, epidemiological, and genomic data with non-health data, such as weather patterns, wastewater surveillance, consumer behaviour, social media, and mobility, and strengthening inter-sectoral collaboration between public and private stakeholders at all levels.

3. Investing in pandemic-resilient *and* climate-resilient health systems

Given their global and interconnected nature, climate and pandemic action should be elevated as top priorities for additional international action and investments. The World Bank, among others, has highlighted the opportunity to [take on the pandemic and the climate crisis in tandem](#). Rather than being seen as a zero-sum competition for resources, an integrated climate- and pandemic-finance agenda could reap significant dividends in both areas *and* enable progress on other global health threats and toward achieving all the Sustainable Development Goals.

Starting with Health and Climate Day at COP28, world leaders have an opportunity to jumpstart progress toward a healthier, climate- and pandemic-resilient world by committing to launch a global expert Commission that would be tasked to consider what it will cost to build pandemic- and climate-resilient health systems.

Significant gaps remain in our understanding of the full cost of investment needed, particularly around what it will take to deliver pandemic- and climate-resilient health systems, and the specific interventions and expenditures that can make the most impact. Key questions include: What exactly do countries need to do to stave off these twin and related threats, particularly around health systems? Which interventions for people, health systems, and ecosystems can deliver the greatest co-benefits across pandemic prevention, health, and climate change? How much will these interventions cost, and how should they optimally be financed?

A global expert Commission could identify the types and levels of investments needed to save the most lives from increasing climate and pandemic threats and improve people's well-being. The Commission should be charged with developing a conceptual framework covering prevention, resilience, and emergency needs; determining the policy interventions needed to help people, ecosystems and society to support the most pandemic- and climate-resilient health systems possible; exploring what financing is needed for different parts of these investments; reviewing different funding vehicles that could be used to build up national health systems; and assessing how existing policy and delivery vehicles such as national resilient health plans and Nationally Determined Contributions (NDCs) could be streamlined.

Leveraging global financial institutions

There are a number of opportunities in the coming year to increase global investments in pandemic- and climate-resilient health systems. At Health and Climate Day at COP28, world leaders must also commit to prioritise additional investments at the intersection of pandemic- and climate-resilience through global financial institutions, including through:

- **Support for a robust replenishment for the World Bank's International Development Association (IDA21)** toward the goal of tripling IDA by 2030, agreeing to allocate a significant portion of the additional resources — including through a robust set of policy commitments and results framework — toward cross-sectoral investments in climate change and pandemic

prevention and preparedness.

- **Support for a robust resource mobilisation effort for the Pandemic Fund in 2024** to reach its US\$10.5 billion annual financing target and help catalyse new investments from governments, the private sector, and philanthropy.
- **Putting the IMF's Resilience and Sustainability Trust (RST) to work for both climate- and pandemic resilience.** To date, none of the RST-supported programs have prioritised pandemic preparedness. The IMF should explicitly present the RST as a tool for both climate change and pandemic preparedness and as an investment priority in Article IV consultations with countries. Use of an analytical tool such as the [World Bank's Country Climate and Development Reports \(CCDRs\)](#) for climate change would help prioritise and support eligible countries to make better use of the RST for both climate and pandemic preparedness.
- **Advanced economies delivering the [full US\\$100 billion promised](#) in channeled Special Drawing Rights (SDRs)** and unlocking further rechanneling options. As a first step, at least five advanced economies should pledge SDRs to the African Development Bank's hybrid capital instrument so it can leverage even more lending on resilience.
- **Expanding natural disaster [debt pause clauses to include pandemics](#)** in all new sovereign loans from the World Bank and other MDBs, as well as from bilateral and private creditors, which could potentially release US\$1 trillion in liquidity to ensure a more timely response to a future pandemic.
- **Fully financing the new [Loss and Damage Fund](#) for climate disasters and accelerating work started under the G7 and G20 to establish a pandemic surge financing mechanism.** These mechanisms should also adopt a dual-risk lens, such that pandemic response measures are climate-smart and climate disaster response and recovery funds also help strengthen health systems and workforce.

Conclusion

Climate change and pandemics both pose systemic threats that require collective, urgent, and unprecedented global action. They share high levels of uncertainty with the increasing risk of potentially catastrophic costs. Mitigating the potential devastation of climate change and pandemics [requires action by all countries](#), working in concert at national, regional, and global levels. Countries too often fail to act until and unless there is an immediate crisis. But as the COVID pandemic and recent extreme climate events have demonstrated, neither climate change nor pandemics will wait — and further delays in action on both puts humanity at ever greater risk.

The recent experiences with COVID-19 and extreme climate events underscore the imperative — and the opportunity — for policymakers to take proactive measures to build both climate- and pandemic-resilience. Specifically, curtailing the burning of fossil fuels is paramount, as it directly impacts human health by increasing vulnerability to respiratory diseases and increasing the likelihood of infectious diseases with epidemic and pandemic potential. Policymakers and financiers also need to take a more integrated and systemic approach to addressing climate- and pandemic-resilience. By establishing an expert Commission to identify the necessary investments, policy interventions, and financing mechanisms and by better leveraging the global financial institutions, world leaders at COP28 can pave the way for nations to build more robust, adaptable, and resilient health systems capable of withstanding the dual challenges posed by a changing climate and pandemics. No less than the future of humanity is at stake.